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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/629,162 | 07/30/2003 | Cindy Xing Qiu | | 5989 |
| 7590 | 01/04/2005 | | EXAMINER | |
| Dr. Cindy X. Qiu 6215 Bienville Street Brossard, QC J4Z 1W6 CANADA | | | WAMSLEY, PATRICK G | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2819 | |

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|------------------------------|------------------------|---------------------|
| | 10/629,162 | QIU ET AL. |
| Examiner | Art Unit | |
| Patrick G. Wamsley | 2819 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 14 December 2004.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 7-13 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 7-13 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 30 July 2003 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) Paper No(s)/Mail Date. ____.
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date ____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: ____.

DETAILED ACTION

Election of Species

In a facsimile filed on 12/14/2004, applicant elected the species depicted in Figure 6(a), readable upon claims 7-13, without traverse. Non-elected claims 1-6 and 14-20 were canceled.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the conducting film forming a ground plane must be shown or canceled from claims 7-13. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 7 is objected to because of the following informalities:

Line 5: Change "separate by a gap" to -- separated by a gap --.

Line 6: Change "along direction" to -- along a direction -.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, certain claimed features are neither depicted in the drawings nor described in specification sections tied to the elected embodiment.

First, while non-elected Figure 3(b) provides a conducting film [54] founding a ground plane, this feature is absent from elected Figure 6(a).

Second, while Figure 6(a) does depict a recess region on cantilever [58], analogous to element [68] in non-elected Figure 5, the recess region of Figure 6(a) is neither marked with a label nor described in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7, 8, 10, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art, hereafter APA, in view of U.S. Patent 6,529,093 to Ma, hereafter Ma.

As shown in Figures 1(a), 1(b), and 1(c), APA discloses a conventional electrostatically actuated MEMS switch [1] comprising a dielectric substrate [2]; an input transmission line [3]; an output transmission line [4]; a gap [5] between the transmission lines [3/4]; actuation top electrodes [10/11]; actuation bottom electrodes [18/19]. Unlike independent claim 7, APA lacks a cantilever [58: Figure 6(a)] and a third actuation electrode [81] deposited upon a second dielectric substrate [82].

In contrast, Ma discloses a MEMS switch having a cantilever beam [503]. Ma also modifies prior art MEMS switches through the use of intermediate actuation electrodes [column 3, lines 16-18], analogous in function to the claimed third actuation electrode. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied Ma's teachings to APA's MEMS switch. The motivation would have been to produce higher switching speeds [column 4, lines 33-34].

For claim 8, as depicted in Figure 1(a), APA's actuation electrodes are thinner than the transmission lines.

For claim 10, Ma's dielectric layers [509/511] prevent DC shorting.

For claim 11, APA's actuation lines [20/21] inherently have sheet resistances greater than the characteristic impedance of APA's transmission lines [3/4].

For claim 12, Ma's cantilever beam [503] may comprise a metallic layer. Various options are listed in lines 28-31 of column 3 in Ma.

Allowable Subject Matter

Claims 9 and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the references of record neither reveal nor render obvious the recited elements for claims 9 and 13, including a recess region in a cantilever and a dielectric stopper in the claimed MEMS switch environment.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 6,800,503 to Kocis et al discloses a MEMS system having a cantilever beam [410]. U.S. Patent 6,798,321 to Hallbjorner provides MEMS switches with cantilever beams [500]. U.S. Patent 6,720,267 to Chen et al forms a cantilever beam model MEMS system. U.S. Patent 6,686,820 to Ma et al shows a MEMS switch with a cantilever beam [18]. U.S. Patent 6,674,141 to Kubena et al discloses a MEMS sensor having a cantilevered beam [2]. U.S. Patents 6,633,212 and 6,496,612 to Ruan et al use a cantilever beams with MEMS switches.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick G. Wamsley whose telephone number is (571) 272-1814. The official facsimile number is (703) 872-9306.


Patrick G. Wamsley
December 29, 2004